BE IT KNOWN that we

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Have invented certain new and useful improvements in

A METHOD OF PRODUCING POLYURETANE PADS AND SIMILAR ARTICLES AND THE ARTICLE PRODUCED THERBY

Of which the following is a complete specification.

This application is qualified as small entity

BACKGROUND OF THE INVENTION

The present invention relates to a method of producing polyurethane pads and similar articles and to an article produced thereby.

It is known to produce articles composed of layers of polyurethane, for example polyurethane pads for grinding and polishing. Some solution for producing grinding and polishing pads are disclosed for example in U.S. patents no. 4,692,199; 5,257,478; 5,900,164. It is believed that the known solutions can be improved.

SUMMARY OF THE INVENTION

Accordingly, it is an object of the present invention to provide a method of producing polyurethane pads and similar articles and an article produced thereby, which is a further improvement of the existing methods and articles.

In keeping with these objects and with others which will become apparent hereinafter, one feature of the present invention resides, briefly stated, in a method of producing polyurethane pads and other articles, comprising the steps of providing at least one polyurethane layer having a first curing agent; providing a second polymer layer having a second curing agent; providing a connecting layer between the first and second layers with said first curing agent as in the first polyurethane layer; and subjected the layers to a thermal treatment so that the same first curing agent migrates from the connecting layer to the said first polyurethane layer and vice versa.

The invention also involves a polyurethane pad or another article, produced by the inventive method.

When, for example a polishing pad is produced in accordance with the present invention, its layers are reliably connected with one another to provide a solid composite article.

The novel features which are considered as characteristic for the present invention are set forth in particular in the appended claims. The invention itself, however, both as to its construction and its method of operation, together with additional objects and advantages thereof, will be best understood from the following description of specific embodiments when read in connection with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is a view showing a grinding or polishing pad produced by a new method in accordance with the present invention and including a body, a connecting layer, and a working layer composed of polyurethane; and

Figure 2 is a view showing a multi-layered article produced in accordance with the present invention.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

An article, for example a pad, composed of two main layers, of which at least one layer is composed of polyurethane in accordance with the present invention is shown in Figure 1. The pad here includes a body which is identified with reference numeral 1, a working layer which is identified with reference numeral 2, and a connecting layer which is identified with reference numeral 3.

The body 1 can be composed of ebonite, polyurethane and the like and is substantially hard to form a hard backing for the pad. The working layer 2 is also composed of a polyurethane. It has a polyurethane base, a curing agent, and also can have with abrasive as well as other ingredients.

The connecting layer 3 can be formed as a connecting film cohesively connecting the working layer 2 with the body 1. The body 1 is produced for example so that after curing it has hardness 30-75 on Shore D scale.

The connecting film 3 can be an elastomeric film, composed for example of butadiene rubber. It can have a thickness of between 20 and 1000 µm.

The working layer 2 composed of polyurethane has a curing agent diamine, for example diamine with trade name MOCA, NH_2-R-NH_2. AL 08/29/04 S.V. 08/30/04 G.B 08/29/04

The composition of the polyurethane working layer 2 can be for example as follows:

Component	Part by weight
Spec flex NC 630 Polyols	80.0
Spec flex NC 710 Copolymer	20.0
Cross-linker	1.5
Water	2.2
Catalyst	0.6
Colorant	0.3
Adhesion promoter	2.0
Cell opener	1.0

The basic properties of polyurethane composition matched to the intended proper choice of the polyols, copolymer polyols, chain extender,

cross-linker and the functionality of the isocyanate. Variation in the final molecular weight per-crosslink (M_c) can change from rigid (M_c~from 300 to 800), to semi-rigid (M_c-from 800 to 2000) and M_c~ above 2000 are flexible.

A simple composition can include:

Component	Part by Weight
Prepolymer RN-15/3 NCO-95%	199.0
Water, blowing agent	0.4
Surfactants, DC-200; BC-57	2.5
Curing agent and Cross Linker, MOCA (inpowder form)	40.0
Linker, MOCA (in powder form)	40.0 (Regular amount is 55)
Catalytic blowing reactant, A530	0.1

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Curing and cross linker agent MOCA (chemical name is: 4,4' methylenbis (2-chloroanilin) create carbamid cross links.

Connection layer between two parts has compositions:

Component	Part by Weight
Elastomere (trade name OZO-70/30	100.0
Crosslink and curing agent, Sulfur	10.0
SOftener, PVC	3.0
Hardener, Duress 12687	4.0
Accelerator, Altax	1.5
Additional cross linker and curing Agent, MOCA in powder form	15.0

In accordance with the present invention, the amount of curing agent in the layers 1 and 2 is reduced for example to 75-80% of conventionally used amounts. The same curing agent, for example MOCA is introduced into the connecting layer 3 in the amount, by which the amount of the curing agent is reduced in the layers 1 and 2 to be connected. if the layer 1 is not composed of polyurethane, the amount of its curing agent can be retained the same, while the amount of MOCA in the layer 2 is reduced to 75-80%, and the connecting layer 3 is provided with MOCA corresponding to the missing 25-20%.

After the layers 1 and 2 are formed of an initial material, they are placed over one another with interposition of the connecting layer and together introduced into mold for thermal treatment for example at the temperature of 135-150°C. During the thermal treatment the curing agent or MOCA migrates from the layer 3 into layers 1 and 2 and vice versa if the layers 1 and 2 are composed of polyurethane. If the layer 1 is composed not of polyurethane but instead for example of ebonite, then MOCA migrates between the layers 2 and 3 and from the layer 3 into the layer 1, while the curing agent of the layer 1 (for example sulfur) migrates into the layer 3.

As a result, a firm connection of the body 1 with the working layer 2 through the connecting layer 3 is provided.

Figure 2 shows a multi-layered article which includes a first polymer layer 11, a first connecting layer 12, a second polymer layer 13, a second connecting layer 15, a third polymer layer 16, a third connecting layer 16, and a fourth polymer layer 17. The polymer layers and the connecting layers are initially produced in the same way as in the embodiment of Figure 1. For example, in the polymer layers 11 and 13, the amount of curing agent of or MOCA is reduced for example by 20%, while the quantity corresponding to the 20% is introduced in the connecting layer 12. During the heat treatment and corresponding process of polymerization, the curing agent migrates between the polymer layers to be connected and the connecting layer therebetween, so as to provide a firm connection.

It will be understood that each of the elements described above, or two or more together, may also find a useful application in other types of constructions differing from the types described above.

While the invention has been illustrated and described as embodied in a method of producing of articles, it is not intended to be limited

to the details shown, since various modifications and structural changes may be made without departing in any way from the spirit of the present invention.

Without further analysis, the foregoing will so fully reveal the gist of the present invention that others can, by applying current knowledge, readily adapt it for various applications without omitting features that, from the standpoint of prior art, fairly constitute essential characteristics of the generic or specific aspects of this invention.

What is claimed as new and desired to be protected by Letters Patent is set forth in the appended claims.